

BEYOND HYDRATION

SUPPLY

Every system of the body is dependent on the efficient flow of water. We're obviously not attached to a continuous water source, so out of necessity our bodies developed a conservation system that recycles water and prioritizes its distribution when supply becomes scarce.

Every 24 hours the body recycles the equivalent of approximately 40,000 glasses of water to maintain its normal physiological functions. Depending upon internal processes and an individual's level of daily physical exertion, the body can lose on-average six to ten glasses of water each day. This deficit has to be resupplied to the body, or resultantly, conservation and priority distribution systems are activated; overtime, chronic water shortage will adversely affect health.

HYDRATION STRATEGIES

First thing upon rising
30 minutes prior to meals
2-3 hrs after your meals
Freely between meals
With salty snacks
Immediately before going to bed
Keep water bottles in the car
Have bottles at the office
Before, during and after exercise
Before, during and after alcohol
In addition to coffee and tea
Increase with colds and infirmities

CONSIDERING SILICIC ACID

According to the extensive research of Dr. Christopher Exley, there is a plausible link to aluminum exposure and a myriad of health conditions of variable etiology. The introduction of aluminum into the human body can happen through environmental exposure, dietary uptake, and/or as a therapeutic introduction; each potentially manifesting as a condition related to the vector of exposure, or any combination of exposure vectors.

Unfortunately traditional methods of chelation and detoxification are useless in removing aluminum from our bodies.

Considering silicic acid (biological form of silicon), its interaction with aluminum has kept it from invading organic life for all of existence. In Dr. Exley's research-informed view, the regular consumption of silicon-rich (30ppm minimum) mineral waters (it will be labeled erroneously as silica on the bottle) is the most effective defense known to date that promotes the body's excretion of aluminum.

BEYOND HYDRATION

Add Silicon-Rich Mineral Waters
Fiji, Volvic, Gerolsteiner
Minimum 1 Liter Per Day

FURTHER READING

Imagine You Are An Aluminum Atom,
Christopher Exley, PhD
[Publications Link](#)

Sources of Exposure

Toxicokinetics and Normal Human Levels

Biomarkers/Environmental Levels

ToxGuide™ for Aluminum Al

CAS# 7429-90-5

September 2011

U.S. Department of Health and
Human Services
Public Health Service
Agency for Toxic Substances
and Disease Registry
www.atsdr.cdc.gov

Contact Information:
Division of Toxicology
and Environmental Medicine
Applied Toxicology Branch

1600 Clifton Road NE, F-62
Atlanta, GA 30333
1-800-CDC-INFO
1-800-232-4636

<http://www.atsdr.cdc.gov/toxprofiles/index.asp>



General Populations

- Aluminum is ubiquitous in the environment. For the general population, exposure to aluminum most likely occurs through the consumption of food (mainly processed foods), water, and aluminum containing medicinals, such as antacids, buffered analgesics, antidiarrheal agents, or antiulcer medication.
- The intake of aluminum from food and water is low, especially compared with that consumed by people taking aluminum-containing medicinals.
- Inhalation exposure and dermal contact may also contribute a small amount to an individual's daily aluminum exposure.

Occupational Populations

- Potential for exposure during the refining of the primary metal and in secondary industries that fabricate aluminum products (such as aircraft, automotive, and metal products) and aluminum welding.

Toxicokinetics

- Aluminum is poorly absorbed following either oral or inhalation exposure and is essentially not absorbed dermally. Approximately 1.5–2% of inhaled and 0.01–5% of ingested aluminum is absorbed. The absorption efficiency is dependent on chemical form, particle size (inhalation), and concurrent dietary exposure to chelators such as citric acid or lactic acid (oral).
- Aluminum binds to various ligands in the blood and distributes to every organ, with highest concentrations ultimately found in bone and lung tissues.
- Absorbed aluminum is excreted principally in the urine and, to a lesser extent, in the bile.

Normal Human Levels

- The total body burden of aluminum in healthy individuals is 30–50 mg.
- Approximately 50% of the body burden is in the skeleton and 25% is in the lungs.
- Aluminum levels in lungs increase with age.
- Aluminum levels in bone tissue of healthy individuals range from 5 to 10 mg/kg.
- Serum levels in healthy individuals range from 1 to 3 µg/L.

Biomarkers

- Aluminum can be measured in the blood, bone, urine, and feces. There are insufficient data to relate aluminum exposure levels with blood or urine levels. Aluminum measured in feces cannot be used to estimate absorption.
- No biochemical or histological changes specific for aluminum exposure were identified.

Environmental Levels

Air

- Average range: 0.005–0.18 µg/m³.
- 0.4–8.0 µg/m³ in urban and industrial areas.

Sediment and Soil

- Concentration in soil varies widely ranging from 7 to over 100 g/kg.

Water

- Generally below 0.1 mg/L in surface water.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Aluminum. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

Chemical and Physical Information

Routes of Exposure

Relevance to Public Health (Health Effects)

Aluminum is a Metal

- Aluminum is a silvery-white metal. In nature it is found in soil, rocks (particularly igneous rocks), and clays as aluminosilicate minerals.
- Due to high reactivity, aluminum does not exist as the metal in the environment; it exists in a combined state with other elements.
- Aluminum metal is used to make a variety of products including beverage cans, pots and pans, automotive components, siding and roofing, and foil.
- Aluminum compounds are used in diverse industrial applications including water treatment, abrasives, and furnace linings. Powdered aluminum metal is used in explosives and fireworks.
- Aluminum compounds are also used in consumer products such as foil and antiperspirants, over the counter and prescription drugs such as antacids, buffered aspirin, and antiulceratives, and in food additives.

- Inhalation – generally limited to occupational exposure.
- Oral – primary route of exposure for the general population. Aluminum is found in food, drinking water, and medicinal products such as antacids and buffered aspirin.
- Dermal (skin) contact – minor route of exposure; aluminum is found in some topically applied consumer products such as antiperspirants, first aid antibiotics, and sunscreen and suntan products.

Aluminum in the Environment

- Aluminum is the most abundant metal in the earth's crust.
- High levels in the environment can be part of the natural deposits in the earth or caused by the mining and processing of its ores and by production of aluminum metal, alloys, and compounds.
- Aluminum cannot be destroyed in the environment. It can only change its form or become attached to or separated from particles.
- Aluminum is only sparingly soluble in water between pH 6 and 8; thus aluminum concentration in most natural waters is extremely low.
- Aluminum is not bioaccumulated to a significant extent.

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- No acute-, intermediate-, or chronic-duration inhalation MRLs were derived for aluminum.

Oral

- An acute-duration oral MRL was not derived for aluminum.
- An MRL of 1 mg aluminum/kg/day has been derived for intermediate-duration oral exposure (15–364 days).
- An MRL of 1 mg aluminum/kg/day has been derived for chronic-duration oral exposure (≥ 365 days).

Health Effects

- The most sensitive target of aluminum toxicity is the nervous system. Impaired performance on neurobehavioral tests of motor function, sensory function, and cognitive function have been observed in animals. Neurobehavioral alterations have been observed following exposure of adult or weanling animals and in animals exposed during gestation and/or lactation.
- Respiratory effects, such as impaired lung function and fibrosis have been observed in aluminum workers.
- Aluminum-containing over the counter medications such as antacids and buffered aspirin are assumed to be safe in healthy people at recommended doses based on historical use. There is some indication that skeletal effects (e.g., osteomalacia) can result from long-term use in some individuals.

Children's Health

- Children who are exposed to high levels of aluminum exhibit symptoms similar to those seen in adults, including neurological effects and skeletal effects.
- We do not know if children are more susceptible than adults to aluminum toxicity.